THE EFFECT OF USING THE CUISENAIRE TECHNIQUE ON THE MENTAL ARITHMETIC SKILLS OF FIFTH-GRADE STUDENTS IN MATHEMATICS

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ABSTRACT
The aim of the research is to identify the effect of using the Cuisenair technique on the mental arithmetic skills of fifth-grade students in mathematics. The current research was limited to those students in Al-Asma Primary School for Boys, affiliated to the Directorate of Education in Baquba, the first semester of the academic year 2020AD-2021AD. Chapters of the Mathematics' textbook contained large numbers in the first chapter, in the second chapter involves the addition and subtraction of large numbers, the third chapter comprises of multiplication of numbers and the fourth chapter consists of division of numbers, the researcher chose two divisions out of three sections for the fifth grade of primary school in a random manner. Section (A) was chosen to represent the experimental group that will study mathematics according to the Cuisenair technique, and section (b) to represent the control group that will study mathematics according to the usual method. The number of the research sample was (60) students, with (30) students for the experimental group and (30) students for the control group.

The semi-experimental approach with partial control was chosen for the two research groups (experimental and control) and the post-test, and the two research groups were rewarded in the variables (pre-knowledge test, previous achievement, intelligence test scores, chronological age).

The two research groups were taught by the researcher, and the behavioral objectives of the four chapters and of Bloom's levels (remembering, comprehension, and application) were formulated, if they reached (78) objectives, and verify its validity and reliability through using appropriate statistical tools.

The results indicated that there was a statistically significant difference at the level of significance (0.05) between the average scores of the experimental group students and the average scores of the control group students in favor of the experimental group that studied the material according to the Cuisenair technique in the mental arithmetic test.

The researcher made several recommendations, including the necessity of training the teaching staff on how to use Cuisenair technology and providing them with clarifications and information about the use of this technology through holding educational courses and seminars. As such, he suggested a set of proposals, including conducting a study similar to the current study with other variables, and other study stages that were not covered by the study.

I. INTRODUCTION TO THE RESEARCH
The Statement of the problem
Mathematics contains many concepts that are difficult to understand if presented in the abstract. It needs clarification and approximation to the minds of learners so that they can understand and realize them and then learn and employ them in their public lives. Therefore, teaching mathematics needs to be developed, and the reality of this process is still traditionally based on Memorization and indoctrination, and despite the modernization and development that occurred in mathematics curricula and books in Iraq, the teaching methods followed by some teachers are still generally traditional and ineffective, when students, not even diagnosing it or identifying its causes. This in turn leads to poor achievement, and deepens negative attitudes towards mathematics. (Al-Dajhdah, 2001: 4).
In fact, many teachers focus in their mathematics teaching on machine comprehension, and this does not rise to the level of ambition, and this may be the reason for the low achievement and level of students’ understanding of mathematics and the failure of many of them in mathematics (Muhammad, 1974: 36).

Therefore, the current research sought to answer the following question:

What is the effect of using the Cuisenaire technique on the mental arithmetic skills of fifth graders in mathematics?

II. RESEARCH'S IMPORTANCE:

First, the theoretical significance

1. Cuisenaire technology improves mathematics teaching,
2. It may contribute to the use of mental arithmetic skills by teachers,
3. The primary school students dealt with their cognitive and personal characteristics that differ from the rest of the stages of age and cognitive development,
4. The Iraqi library may be enriched with a new study on the Cuisenaire technique due to its rarity, according to the researcher’s knowledge, and
5. The scarcity of studies dealt with the Cuisenaire technique at the local level and in mathematics in particular.

Second: The practical importance:

1. This study may help mathematics teachers to activate the mathematics lab with the activities it offers.
2. Applying technology in the primary stages, which is the most important stage of the study, as it provides the students with the important basics for its continuity in the later school stage.
3. Its results may be used in developing and evaluating mathematics curricula, especially in the basic stages of learning.
4. This research may contribute to preparing and preparing for conducting other research and studies in the same direction.

The importance of the study stems from the importance of learning mathematical skills and the importance of studying the effect of using the Cuisenaire technique on students’ achievement in mathematics. Cuisenaire's technique in mathematics locally and the study achieves the following:-

1. The study provides teachers and educators with practical models for teaching mathematical concepts and operations using the Cuisenaire technique, which makes the student the focus of the educational process, which develops their mental arithmetic skills and increases their effectiveness and participation.
2. The study provides teachers and educators with a guide showing how to analyze content, how to use the Cuisenaire technique in practical classroom sessions, and how to evaluate the impact of its use.
3. The study works on facing the difficulties that the learners face in learning mental arithmetic skills and showing practical and realistic studied solutions.
4. The study benefits curricula makers in developing methods of communicating information and embedding curricula with means that increase students’ interaction with the content.

Objectives of the research: The current research aims to identify the effect of using the Cuisenaire technique on the mental arithmetic skills of fifth grade students.

The Two Research Hypotheses:
There is no statistically significant difference at the significance level (0.05) between the average scores of the experimental group students who will study mathematics using the Cuisenaire technique and the average scores of the control group students who will study mathematics according to the usual method in the mental arithmetic test.

**Research limits:** The limits related to research will be as follows:

- Objective limits: The current research will be limited to the use of the Cuisenaire technique in teaching mathematics to fifth grade students
- Spatial: in the primary school affiliated to the General Directorate of Education in Baqubah
- Temporal: in the first semester of the academic year (2020-2021)

**Definition of Terms:**
Cuisenaire technique: defined by (Al-Barakani, 2001 AD):

They are wooden or plastic pieces in the form of regular shaped rods, the cross-sectional area of each piece ranges from 1 cm to 10 cm, and each piece has its own color. (Al-Burkany, 2001: 41).

Mental arithmetic: demarcated by (Al-Saadi and Al-Tai, 2011) as:

It is the ability to find the result of the arithmetic process without using paper and pen or any other aid, through quick and instantaneous retrieval of numbers facts by finding answers using strategies that the student performs automatically. (Al-Saadi and Al-Tai, 2011: 245-246).

**Theoretical Framework and Previous Studies**

**First, a theoretical framework:**

**Cuisenaire technique:**

It consists of a number of wooden pieces of regular shape, the area of each piece is 1 cm and its lengths range from 1 cm to 10 cm, and each rod is distinguished by a special color, and the rods of one color are equal in length. The bars consist of the following colors arranged according to their lengths, noting that the bars that share one color are equal in length, and each length has its own color - white name, 2 red name, 3 cm light green, 4 pink, 5 cm yellow, 6 dark green, 7 black, 8 brown names, 9 cm blue, 10 cm orange.

**How to teach with the Cuisenaire technique:**

Kurumeh, & Acore, (2008) put several steps that the teacher can take to teach mathematics using the Cuisenaire technique, which are:

- Divide the class pupils into groups of 3-4 pupils,
- Distribute pieces of Cou zener,
- Present the expected objectives of the lesson, and
- Determine the type of cooperation necessary between students to achieve these goals.

The teacher is a facilitator, facilitator and organizer only for learning.

Let the students explore the learning environment and come to relationships and conclusions.

Making the student's previous experiences that determine the method of learning and teaching, and that generates relationships.

The effect of discussion among students has been done about what has been learned, (Kurumeh, & Acore, 2008, 342).
Mental Arithmetic

The objectives of teaching mental arithmetic:

The objectives of teaching mental arithmetic consist of two main areas:

1. **The utilitarian goal:** This goal is due to the urgent and necessary need for mental arithmetic in many practical and daily life situations. We find that many illiterate people have the superior ability to do arithmetic mentally and quickly as a result of their training in this type of arithmetic by virtue of their work and professions in arithmetic transactions, market, while we find many educated people are forced to use the automatic account (calculator) or written account (paper and pen) when they need to find the results of daily accounts, and this is the result of their inability to do mental calculation in many cases of buying and selling even in the case of performing arithmetic operations that contain small numbers.

2. **The educational goal:** This goal is manifested in being one of the effective means of mental exercise and developing the ability to think among students, and making the lesson lively and interesting, as it is through mental calculation that we can achieve many educational goals, such as:
   
   A. Enhance memory.
   B. Developing observation.
   C. It is used as an element of suspense, excitement and attracting the attention of students.
   D. Increasing students' motivation to learn and teach.
   E. It is the bridge that connects mathematical facts with algorithms, and through it some basic facts are applied, and thus helps the student to develop his mathematical knowledge. (Mohammed et al., 1997: 122)

**Distinctive Features of Mental Arithmetic:**

Since mental arithmetic is important in life, it has distinct, multiple, diverse, and important characteristics, and these characteristics include:

1. Its primary focus is the preparation account.

2. A one hundred percent correct answer is given, and there is no room for approximation.

3. This type of calculation is done mentally without using any external medium such as a calculator, paper, or pen.

4. It emphasizes the importance of the place value of the number, and deepens the learners' awareness of it. It also emphasizes the importance of tens in the decimal system, and deepens the learners' understanding of this system.

5. Explains to learners the relationship between preparation, and leads to a deep awareness of this relationship.

6. It leads to economy in time, as it does not need a long time to reach the output.

7. It helps learners to focus their attention directly on the issue and to think about the outcome.

8. It is an effective means of employing the basic properties of arithmetic operations (such as the aggregation property, and the distributive property).

9. The teacher can discover through him the ability of learners and the extent of their ability to think and create when he encourages each of them to clarify his way of how to reach the output mentally.

10. It is of great importance when starting to clarify a new lesson in all stages of the study, as it gives simple examples that include small numbers, so the learners reach the teacher’s guidance to the result or the solution in a mental way, and this helps them focus their attention all to the method of the solution.
It leads to enriching the curricula when it is used as a puzzle or arithmetic games, with which the learners scramble to reach the output. It is also considered one of the entertainment methods used by the teacher when the learners are bored.

It encourages learners to think freely, and the learner's follow-up to the solution of his fellow learners develops the ability to think. (Mohammed et al., 1997: 133-134).

It improves the performance of the learner's mind and breaks the barrier of fear of mathematics.

It helps the learners to focus their attention directly on the issue and to think about the outcome.

Attention to mental arithmetic does not mean that the teacher neglects written or written arithmetic, but rather that he exercises the learners on mental arithmetic whenever he finds that his students have the ability to think about reaching a solution in a mental way. (Turkistani, 2006: 27).

Components of Mental Arithmetic:

In order to achieve a broader and more comprehensive understanding of mental arithmetic, it is necessary to understand its basic components, which Morgan (Morgan, 1999) summarized in three components:

1- Emotional components

It is represented in providing students with mental arithmetic skills to develop their confidence in their ability to solve mentally. Children gain confidence in the mental methods they use if they are allowed to build and discover mathematics on their own, especially when mathematics is presented in meaningful situations. The emotional components of mental arithmetic can be summarized as follows:

- Confidence in the ability to solve mentally.
- Understand the importance and usefulness of mental arithmetic.
- Realizing that mental methods can develop good understanding (Al Balushi, 2005:5).

2- Conceptual components

It is represented in the ability to identify and distinguish the arithmetic content in which the use of mental arithmetic is appropriate, as the student determines the method he uses to solve the problem according to the process presented to him, through which he can reach the mathematical concept, and students often choose the appropriate strategy for the solution based on their understanding of numbers and operations, and we can Summarize the conceptual components of mental arithmetic in the following:

1 Realizing the mathematical content in which mental calculations can be more appropriate.
2 Accepting more than one strategy to get a mentally correct answer.
3 Realizing that the appropriateness of the strategy to solve mentally depends on the content of the calculation process.

Concepts and Associated Skills

It is represented in a set of skills that develop the mental arithmetic of the student and is represented in the ability to:

1 Translating the issue into a picture or form that is easy to deal with mentally.
2 Understand and apply place value concepts.
3 Recall and remember basic facts related to the four processes.
4 Dealing with multiples and powers of ten.
5 Synthesize and analyze numbers and express them in a variety of ways.

6 Retrieve and use a wide range of number relationships including whole numbers, fractions, decimals, and percentages.

7 Use the commutative and grouping properties of addition and multiplication.

8 Using the distributive property for multiplication and division, (Al Balushi, 2005: 5-6).

**Strategies**

- Directed strategies based on understanding
  - Count by adding
  - Count in larger
  - Count back to the second number
  - Counting forward is like subtracting by twos
  - Counting backward is like adding

- Strategies based on machine
  - Working
  - Use of Fives Or
  - Add or Subtract
  - Parts from the first
  - Omitting zeros

Using algorithms for Mental writing

**Figure (1)**(Mochon & Roman, 1998 : 35-49)

**Second / previous studies**

Previous studies related to the Cuisenaire technique and mental arithmetic

**Table (1)**

<table>
<thead>
<tr>
<th>Study results</th>
<th>Statistical means</th>
<th>Study stage</th>
<th>Subject</th>
<th>Sample size and gender</th>
<th>Independent variable</th>
<th>Study method</th>
<th>Name of researcher, country and year of study</th>
</tr>
</thead>
<tbody>
<tr>
<td>There are statistically significant differences at the level (0.05) In the</td>
<td><strong>(ancova)</strong> testing the study’s hypotheses</td>
<td>fifth-grade</td>
<td>Mathematics</td>
<td>(49) students</td>
<td>The effect of using Quasner’s pieces in teaching mathematics on the achievement of fifth-grade students</td>
<td>Experimental</td>
<td>Al-Shammari, (2014) Saudi Arabia</td>
</tr>
<tr>
<td>dimensional achievement between the mean of the experimental group and the mean of the control group. 1-The level of numerical sense among the sample members is low. 2-The students’ mental arithmetic level is better than their number sense level 3-There is a</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The researcher used (chi-square.(x2) and Kewder Richardson equation (20))</td>
<td>Intermeditate school</td>
<td>Mathematics</td>
<td>(240) male and female</td>
<td></td>
<td></td>
<td>Al-Sedawi, (2008) Iraq</td>
<td></td>
</tr>
</tbody>
</table>
relationship between numerical sense and mental arithmetic among third-grade intermediate students.

4-Existence of a correlation Positive and statistically significant at the level of significance (0.05) between the average scores of the numerical sense test and the mental arithmetic rate for third-grade intermediate students and according to the variable (male-female).

Chapter Three / Research Methodology and Procedures

First: Experimental Design:

The experimental design aims to determine the effect of an independent variable on a dependent variable in a specific time and place. (Farhaty, 2012: 60), and the researcher adopted the quasi-experimental design with (partial control for the two groups), the experimental and the control one with the test for the two post groups in the achievement and mental arithmetic test.

Table (3)

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Independent Variable</th>
<th>Equivalence Of Two Groups</th>
<th>Group</th>
<th>Seq.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mental Arithmetic</td>
<td>Cuisenaire Technique</td>
<td>Previous Knowledge - Intelligence Test -Previous Collection -Chronological Age In Months</td>
<td>Experimental Group</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Control Group</td>
<td>2</td>
</tr>
</tbody>
</table>

Second: Research Population and its Sample;

The current research community is represented by the students of the fifth primary grade of the General Directorate of Education in Diyala Governorate - Baquba, for the school year (2021-2020), and the Al-Asama
Primary School for Boys was chosen, which was deliberately chosen to implement the research experience, as the number of members of the research sample reached (60) students. They are divided into two groups, the experimental number is (30) students, and the control group number is (30) students, as shown in the table.

### Fourth: Control Procedures:

**Internal safety of experimental design**

Table (3) The results of the t-test for the chronological age, prior knowledge, previous achievement and intelligence of the students of the two research groups

<table>
<thead>
<tr>
<th>Sig. at level 0.05</th>
<th>T-value</th>
<th>Degree of freedom</th>
<th>Standard deviation</th>
<th>Arithmeti c mean</th>
<th>Sample size</th>
<th>Group</th>
<th>variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Sig.</td>
<td>2,000</td>
<td>0.837</td>
<td>58</td>
<td>4.375</td>
<td>113,033</td>
<td>30</td>
<td>Experimental</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5,160</td>
<td>112,000</td>
<td>30</td>
<td>Control</td>
</tr>
<tr>
<td>Non-Sig.</td>
<td>2,000</td>
<td>0.759</td>
<td>58</td>
<td>4.020</td>
<td>12,333</td>
<td>30</td>
<td>Experimental</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4.795</td>
<td>13,200</td>
<td>30</td>
<td>Control</td>
</tr>
<tr>
<td>Non-Sig.</td>
<td>2,000</td>
<td>0.084</td>
<td>58</td>
<td>1.539</td>
<td>8,900</td>
<td>30</td>
<td>Experimental</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.552</td>
<td>8,933</td>
<td>30</td>
<td>Control</td>
</tr>
<tr>
<td>Non-Sig.</td>
<td>2,000</td>
<td>0.306</td>
<td>58</td>
<td>2.975</td>
<td>9,100</td>
<td>30</td>
<td>Experimental</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2.928</td>
<td>9,333</td>
<td>30</td>
<td>Control</td>
</tr>
</tbody>
</table>

**External Safety of Experimental Design**

In addition to the above procedures of statistical equivalence between the two research groups, the researcher tried, as much as possible, to control some extraneous (non-experimental) variables that affect the course of the experiment.

The following is an overview of these variables and how to adjust them:

1- **Maturity:** There were no differences between the students of the two groups (experimental and control) with regard to maturity due to their close age, as well as their subjection to the experiment in the same period of time.

2- **Experimental conditions and accompanying accidents:** It means all the conditions and accidents that can happen, which are exposed to the members of the research sample during the duration of the experiment. (experimental and control group) for any accident inside or outside the experiment during the experiment period.

3- **Measurement tools:** The researchers used the same measurement tools with the students of the two groups (experimental and control), represented by (the mental arithmetic test).

4- **Experimental extinction:** The current research experience has not been exposed to cases of abandonment or interruption of the students of the sample members of the school search, whether as a result of illness or death, except for cases of individual absences from work in a small and almost equal percentage in the two groups.

### III. EFFECT OF EXPERIMENTAL PROCEDURES:

**A- Confidentiality of the experiment:** The researcher was keen to keep the research confidential in agreement with the school administration and not to inform the students of the nature and purpose of the research, as the school administration presented the researcher as a new teacher for the subject in order to control this variable, so that their enthusiasm for the experiment would not change and their activity or their dealings with the experiment would not change.

**B- Classes distribution:** the weekly lesson schedule for each of the two research groups was organized with the school administration, to ensure that the classes were equal between the two groups during the week, so the researcher made sure that the students of the two research groups got the same number of classes, the researcher...
was studying a weekly class for each group and did not The researcher allows any of the students of the two research groups to attend with other than his group

C- Duration of the experiment: The duration of the experiment was the same in the two research groups, as the researcher began teaching the two research groups on Wednesday (2/12/2020) until (21/2/2021).

D- School of the subject: The two researchers themselves studied the two research groups (experimental and control), and this gives the results of the experiment a degree of accuracy and objectivity.

E- Determining the study subject: The study subject was specific to the experiment, unified for the two research groups, and it is one of the topics of the mathematics book for the fifth grade of primary school to be taught by the Ministry of Education for the academic year (2020-2021).

F- The place of the experiment: in one school (Al-Asmaa Elementary for Boys) for the two groups (experimental and control) and in two similar classes in terms of space, lighting, number of seats, their quality and ventilation, meaning that the two groups were studied under similar conditions.

Fifth: Research tools; Instrumentation:
First: Test mental computation;
Because the two researchers did not obtain a ready-made test to measure mental arithmetic that matches the nature of the primary stage, the fifth grade, and the subject matter, the researchers prepared a mental arithmetic test, and the researchers followed the following steps in preparing it:

1 - Determine the goal of the mental arithmetic test
The test aims to measure the level of mental arithmetic for fifth-grade students in mathematics for the current research

2-Determining the number of test items: The two researchers prepared the test items consisting of (15) test items and the type of essay test.

3-Validity of the test items: The researchers presented the test to a group of arbitrators with expertise in teaching methods to determine the validity of the items to measure the level of mental arithmetic and to verify their suitability with his goal. The researcher benefited by giving their opinions:

The instructions were clear and appropriate to the level of the students.

✓ The validity of each of the paragraphs to measure the required attribute and its clarity.
✓ The researcher has benefited from specialists and arbitrators about the development of the proposed solutions, their rationale and the extent of their relevance to the paragraph.

4-Test instructions: The researchers prepared the test instructions to clarify the purpose of the test to be in the simplest possible form, so the formulation of the instructions should be in a simple way so that the respondent can understand the paragraph and urge him to respond and make maximum effort, taking into account the accuracy after reading the instructions to the students to clarify how to answer the test questions, the time limit for the answer and some needs to be taken into account before answering.

5-Correction of the test: A key has been set for the typical answer for all the paragraphs after they were presented to a group of specialists in the field of mathematics and its teaching methods, who agreed that they are typical solutions for the paragraphs presented adopted as a standard in correcting students’ answers to the test paragraphs, and it was determined to give three degrees for the correct answer, and give a zero for the wrong answer, left over or two answers.

6-The validity of the test: The honesty of the test means that it is the accuracy with which the test measures what it should measure, or the extent to which the test performs the hypothesis that it must achieve, or the extent to
which it performs the function it is supposed to perform when it is applied to the category for which it was set (Kafha, 2003: 109) and to verify From the validity of the test, the researchers relied on the following:

*Apparent honesty:* where the researcher presented the test paragraphs to a group of arbitrators specialized in the methods of teaching mathematics, to give their notes, opinions and evaluation, and the results came with the agreement of most arbitrators on the content of the test.

*Content validity:* The validity of the internal consistency of the mental arithmetic test was confirmed by finding the correlation between the paragraph degree with the degree of the field and the total degree of the test. The skill to which it belongs, as the values of the correlation coefficients ranged between (0.31-0.52), which is a good indicator of the validity of the construction of the mental arithmetic test.

The validity of the content, which means that the content of the test with all its paragraphs represents the behavior that is measured by the test in all its aspects, and the validity of the content, is one of the most usable types of honesty, especially with regard to cases of test measurement, and the test and the components of the behavior to be measured. The mental arithmetic test consisting of (15) items was presented to a group of specialists and arbitrators from mathematics teaching methods and subject teachers to show the extent to which the test included the content. The mental arithmetic is ready to be applied to the exploratory sample.

7-The exploratory application of the test

Difficulty coefficient: After calculating the difficulty coefficient, it became clear that all the paragraphs fall within the acceptability of the difficulty of the paragraphs, and the values of the difficulty coefficient ranged between (0.45) (0.68), and (Bloom) determined the acceptable difficulty coefficient between (0,20) and (0, 80).

Discriminative power: the discriminatory power, all test items were (0.42) and above, and thus all items are distinguished between high and low performance students, as (Ebel) sees that the test items are distinguished as good if they were (0,30) and more (Ebel, 1972:406).

Test Reliability:

After applying the tool to the statistical analysis sample of (100) students, the researchers extracted the reliability coefficient by the half-split method (even and odd), thus the value of the Pearson correlation coefficient was (0.78), and after correcting the test using (Spearman-Brown equation) the correlation reached (0.876), which is a coefficient of an acceptable and good correlation, as (Likert) mentioned that the reliability coefficient that can be adopted is between (0.62-0.93). (Likert, 1934: 228).

Sixth: Application of the experiment: The researchers applied the experiment in the first semester of the academic year 2020-2021), after the researchers completed the requirements for conducting the experiment from selecting the two groups, achieving parity between them and determining the scientific material, the experiment began on Tuesday, corresponding to 12/2 (2020) and ended on Sunday Corresponding to (18/2/2021).

Seventh: Application of the experiment:

The two researchers applied the experiment in the first semester of the academic year 2020-2021), after the researcher completed the requirements for conducting the experiment by selecting the two groups, achieving equivalence between them and determining the scientific material, she began applying the experiment on Tuesday, corresponding to (8/12 /2020 and ended on Thursday, corresponding to (18/2 /2021).

Seventh: Statistical Means

The researchers used the appropriate statistical methods, which are: the t-test for two independent samples, the Pearson correlation coefficient, the chi-square test, the difficulty coefficient and the discrimination coefficient, the effectiveness of the wrong alternatives, as well as the researcher uses the statistical program of (SPSS).

The Fourth Chapter Presents and Interprets the Results

The results of the mental arithmetic test

There is no statistically significant difference at the significance level (0.05) between the average scores of the experimental group students who will study mathematics using the Cuisenaire technique and the average scores
of the control group students who will study mathematics according to the usual method in the mental arithmetic test.

To verify this hypothesis, the researchers used the statistical package for social sciences program, version (26) (spss-26), including the T-test for two independent samples, to test the significance of the differences between the arithmetic mean of the scores of the experimental group (32.333), whose number is (30), And the arithmetic mean of the scores of the control group is (27.967), whose number is (30), and thus the calculated T-value of the mental arithmetic variable reached (2.160), which is greater than the tabular T-value of (2.000) with a degree of freedom (58) and at the level of significance (0.05), Since the calculated t-values are greater than the tabular t-value, the second null hypothesis is rejected, that is, there is a statistically significant difference between the two groups in the mental arithmetic variable, and in favor of the group with the highest arithmetic mean, which is the experimental group, and table (17) illustrates this.

Table (17) It shows the results of the T-test for two independent samples of the mental arithmetic variable

<table>
<thead>
<tr>
<th>Group</th>
<th>Experimental</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degree of freedom</td>
<td>58</td>
<td></td>
</tr>
<tr>
<td>Standard deviation</td>
<td>8,264</td>
<td>7,369</td>
</tr>
<tr>
<td>Arithmetic mean</td>
<td>32,333</td>
<td>27,967</td>
</tr>
<tr>
<td>Sample size</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Sig. at level 0.05</td>
<td>2.000</td>
<td>2.160</td>
</tr>
</tbody>
</table>

Second: Interpretation of the results:

Through the results of the current research, it becomes clear to us the following:

The students of the experimental group who studied mathematics according to the Cuisenaire technique outperformed the students of the control group who used the usual method in the mental arithmetic test.

The researcher attributes the reasons for the superiority in the mental arithmetic test to the following reasons:

1. The topics studied during the experiment (large numbers - addition and subtraction of large numbers - multiplication of numbers - division of numbers) may be suitable for using the Cuisenaire technique.

2. This technique reduces the introversion and isolation of a number of students and reduces the state of fear of failure in another number.

3. The Cuisenaire technique that the researcher used with the students of the experimental group constitutes an opportunity to practice alternative methods of school learning.

4. The researchers noticed that the use of the Cuisenaire technique made the learning process interesting for the students, likable and interesting for them, because it provides an opportunity for active interaction between them.

Third: Conclusions:

In the light of the results reached by the researcher, she concluded the following:

1. The use of the Cuisenaire technique showed a clear positive effect on the mental arithmetic of the fifth grade students.

2. Procedures using the Cuisenaire technique are consistent with what modern education focuses on making students the focus of the educational process.

Fourth: Recommendations:

In light of the research results and conclusions, the researcher recommends the following:

1. Activating the teaching method using the Cuisenaire technique in teaching mathematics curricula.

2. The necessity of holding training courses for mathematics teachers at the primary level in the use of modern technologies in education, including the Cuisenaire technique.
3 Enriching the prescribed mathematics books with various activities that motivate learners to use the Cuisenaire technique.

4 Linking mathematical concepts to life applications that build their idea on the basis of mental arithmetic.

Fifth: Suggestions:
In light of the study results, the researcher suggests a procedure:

1 A study to find out the effect of the Cuisenaire technique on the achievement of mathematics.

2 A study to find out the effect of the Cuisenaire technique on the acquisition and retention of concepts.

3 The effect of a remedial program based on the use of the Cuisenaire technique in teaching mathematics to raise the level of low achievement.

4 Conducting a study similar to the study with other variables that the current study deals with.

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